



LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA8 | The Chalfonts and Amersham

Data appendix (AQ-001-008)

Air quality

November 2013

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA8 | The Chalfonts and Amersham

Data appendix (AQ-001-008)

Air quality

November 2013

ES 3.5.2.8.2



Department for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

A report prepared for High Speed Two (HS2) Limited.

High Speed Two (HS2) Limited,
Eland House,
Bressenden Place,
London SW1E 5DU

Details of how to obtain further copies are available from HS2 Ltd.

Telephone: 020 7944 4908

General email enquiries: HS2enquiries@hs2.org.uk

Website: www.hs2.org.uk

High Speed Two (HS2) Limited has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full on the HS2 website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard please contact High Speed Two (HS2) Limited.



Printed in Great Britain on paper
containing at least 75% recycled fibre.

Contents

Contents	i
1 Introduction	1
2 Policy framework	2
3 Baseline air quality data	3
3.1 Existing air quality	3
3.2 Receptors	4
4 Dust impact evaluation and risk rating	5
5 Air quality assessment - road traffic	9
5.1 Overall assessment approach	9
5.2 Construction traffic model	9
5.3 Operational traffic model	12
6 References	13

List of tables

Table 1: Evaluation and risk rating of construction activities	5
Table 2: Summary of construction dust impacts and effects	8
Table 3: Modelled receptors (construction phase)	10
Table 4: Background 2017 concentrations at assessed receptors	10
Table 5: Summary of DMRB annual mean NO ₂ results (construction phase)	11
Table 6: Summary of DMRB annual mean PM ₁₀ results (construction phase)	11

1 Introduction

1.1.1 The air quality appendix for the Chalfonts and Amersham community forum area (CFA8) comprises:

- discussion of the policy framework (Section 2);
- baseline air quality data (Section 3);
- dust impact evaluation and risk rating (Section 4); and
- air quality assessment - road traffic (Section 5).

1.1.2 Maps referred to throughout the air quality appendix are contained in the Volume 5, Air Quality Map Book.

2 Policy framework

- 2.1.1 Policy CS4 of the Chiltern Core Strategy¹ contains specific measures to minimise impact on designated local air quality management areas (AQMAs). Saved Policies GC3 and GC9 of the Chiltern Local Plan 1997² aim to achieve good standards of amenity and prevent unacceptable levels of air pollution from new development. Policy CP1 of the Three Rivers Core Strategy³ and Policy N.12 of the Three Rivers Local Plan⁴ also make similar provisions and aim to minimise the subsequent adverse impacts on amenity and health.

¹ Chiltern District Council (2011) *Core Strategy for Chiltern District 2011*.

² Chiltern District Council (1997) *Chiltern District Local Plan 1997*.

³ Three Rivers District Council (2011) *Core Strategy 2011*.

⁴ Three Rivers District Council (2002) *Local Plan 1996 - 2011*

3 Baseline air quality data

3.1 Existing air quality

Local authority review and assessment information

- 3.1.1 Chiltern District Council (CDC) carries out monitoring of nitrogen dioxide (NO₂) across its area. The council's review and assessment process has identified that the district meets air quality standards in the majority of areas although traffic has caused an increase in levels of pollutants in some areas. In 2007 CDC designated an AQMA along Berkhamstead Road/ Broad Street (A416) in Chesham due to exceedances of nitrogen dioxide (NO₂) at kerbside monitoring locations. This area lies more than four kilometres from the route and is outside the study area.
- 3.1.2 Baseline concentrations of NO₂ and particulate matter as PM₁₀ and PM_{2.5} in the study area are well within air quality standards.

Local air quality monitoring data

- 3.1.3 Air quality standards are as follows:

- 40µg/m³ as an annual mean for NO₂ and PM₁₀;
- 200µg/m³ one-hour mean for NO₂ not to be exceeded more than 18 times a year (equivalent to the 99.8th percentile of the one-hour mean);
- 50µg/m³ 24-hour mean for PM₁₀ not to be exceeded more than 35 times a year (equivalent to the 90.4th percentile of the 24-hour mean); and
- 25µg/m³ as an annual mean for PM_{2.5}.

- 3.1.4 There are no monitoring sites within the area that are relevant to this assessment.

Background pollutant concentrations

- 3.1.5 Estimates of background air quality have been taken from Department for Environment, Food and Rural Affairs (Defra) maps⁵. Background NO₂ concentrations are within air quality standards throughout the study area and annual mean concentrations were in the range 13.0µg/m³ - 17.5µg/m³ in 2012. Background PM₁₀ concentrations are within air quality standards throughout the study area, with annual mean concentrations in the range 15.0µg/m³ - 16.3µg/m³ in 2012.

Local emission sources

- 3.1.6 The main source of pollution in the area is road traffic. Major roads include the A413, A355 and the B442.

⁵ Department for Environment, Food and Rural Affairs (Defra) (2012) *Defra Background Pollutant Concentration Maps*; <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>; Accessed: July 2013

3.2 Receptors

Human

Construction phase

- 3.2.1 Potential receptors are primarily those residential properties close to construction activity and alongside roads where traffic flows will change as a consequence of construction activity. Notable receptors in relation to construction activity include residential properties at Cricket Field Cottages, Turners Wood Farm, Upper Bottom House Farm, Lower Bottom House Farm and Ashwell's Farm. Amersham Hospital is also close to construction activity. Notable receptors near roads where traffic flows will change are Bircham Cottage, near junction 17 of the M25. Receptors at greatest risk of dust effects are indicated in Map AQ-02-008-01 and Map AQ-02-008-02 (Volume 5, Air Quality Map Book).

Operational phase

- 3.2.2 Once operational only receptors located on roads where there are possible increases in operational traffic have the potential to be affected.

Ecological

Construction phase

- 3.2.3 No ecological receptors in the study area are predicted to be affected by air quality as a result of the construction phase.

Operational phase

- 3.2.4 No ecological receptors in the area are predicted to be affected by air quality as a result of the operational phase.

4 Dust impact evaluation and risk rating

4.1.1 The following sections provide details of the assessment of construction impacts following the Institute of Air Quality Management (IAQM) guidance⁶. Where considered useful to identify receptors and their relationship to the construction activity, a specific figure is provided.

Table 1: Evaluation and risk rating of construction activities

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact	Principal justifications
Chalfont St. Peter ventilation and intervention shaft (vent shaft) worksite - Turners Wood Farm, Cricket Field Cottages and Ashwell's Farm (Map AQ-02-008-01, Figure 8.1 and 8.2 (Volume 5, Air Quality Map Book))						
Demolition	N/A	N/A	N/A	N/A	N/A	No demolitions are required.
Earthworks	50-100m	Medium	Medium	Low	Negligible	1. Total site area 2,500m ² - 10,000m ² 2. No receptors within 20m of the worksite.
Construction	50-100m	Medium	Medium	Low	Negligible	1. Use of dusty construction materials. 2. No receptors within 20m of the worksite.
Trackout	Less than 20m	Small	Medium	Medium	Negligible	1. Fewer than 25 heavy goods vehicle (HGV) trips in any one day. 2. Fewer than 10 receptors within 20m of the route.

⁶ Institute of Air Quality Management (IAQM), (2011), *Guidance on the assessment of the impacts of construction on air quality and the determination of their significance*

Appendix AQ-001-008

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact	Principal justifications
Chalfont St. Giles ventilation and intervention shaft (vent shaft) worksite - Upper Bottom House Farm and Lower Bottom House Farm (Map AQ-02-008-01, Figures 8.3 and 8.4 (Volume 5, Air Quality Map Book))						
Demolition	Less than 20m	Small	Medium	Medium	Negligible	1. Construction material with low potential for dust release. 2. Fewer than 10 receptors within 20m of the site.
Earthworks	50-100m	Medium	Medium	Low	Negligible	1. Total site area 2,500m ² - 10,000m ² 2. No receptors within 20m of the worksite.
Construction	50-100m	Medium	Medium	Low	Negligible	1. Use of dusty construction materials. 2. No receptors within 20m of the worksite.
Trackout	Less than 20m	Medium	Medium	Medium	Negligible	1. Fewer than 100 HGV trips in any one day. 2. Fewer than 10 receptors within 20m of the route.
Amersham ventilation and intervention shaft (vent shaft) worksite - Amersham Hospital (Map AQ-02-008-02, Figure 8.5 (Volume 5, Air Quality Map Book))						
Demolition	N/A	N/A	N/A	N/A	N/A	No demolitions are required.
Earthworks	50-100m	Medium	Medium	Low	Negligible	1. Total site area 2,500m ² - 10,000m ² 2. No receptors within 20m of the worksite.
Construction	50-100m	Medium	Medium	Low	Negligible	1. Use of dusty construction materials. 2. No receptors within

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact	Principal justifications
						20m of the worksite.
Trackout	20-50m	Large	Medium	Low	Negligible	<ul style="list-style-type: none"> 1. Greater than 100 HGV trips in any one day. 2. No receptors exist within 200m of the site entrance.

Appendix AQ-001-008

Table 2: Summary of construction dust impacts and effects

Location	Magnitude of impact	Effect of dust-generating activities	Additional mitigation
Chalfont St. Peter vent shaft worksite	Negligible	Not significant	None required
Chalfont St. Giles vent shaft worksite	Negligible	Not significant	None required
Amersham vent shaft worksite	Negligible	Not significant	None required

5 Air quality assessment - road traffic

5.1 Overall assessment approach

- 5.1.1 The air quality assessment for road related emissions has considered the use of different approaches based on the scale of changes in traffic and road alignment. Where the Design Manual for Roads and Bridges⁷ (DMRB) thresholds detailed in the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1) will not be exceeded, any additional assessment is not required as the air quality impacts will be minimal. If these thresholds are breached then a quantitative assessment would have been carried out.
- 5.1.2 Where the road configuration is straightforward and the air quality within standards, the DMRB screening method has been used to predict changes in air quality. Professional judgment has been used to select the appropriate tool for each area.
- 5.1.3 In this study area the DMRB screening method was considered to be a suitable tool for the assessment.

5.2 Construction traffic model

- 5.2.1 Roads assessed for construction traffic are detailed in Volume 5: Appendix TR-001-000. Scenarios assessed were based on maximum traffic flows on affected roads during the construction phase of the Proposed Scheme, even though some of these may be of limited duration.

⁷ Highways Agency (2007), *The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07)*

Receptors assessed

- 5.2.2 The additional traffic and the need for road diversions have the potential to change air quality for some receptors. During the construction phase, all road links identified for assessment will experience increases in traffic numbers. Where DMRB criteria for undertaking a local air quality assessment were met, a number of receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are presented in Table 3 and in Map AQ-01-008 (Volume 5, Air Quality Map Book).

Table 3: Modelled receptors (construction phase)

Receptor	Description/location	Ordnance Survey coordinates
8-1	Bircham Cottage (M25 J16 to J17 (north of clockwise slip roads))	502875, 193967

Background concentrations

- 5.2.3 The background concentrations used in the assessment are shown in Table 4 taken from the Defra maps.

Table 4: Background 2017 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ($\mu\text{g}/\text{m}^3$)		
	NOx	NO ₂	PM ₁₀
8-1 Bircham Cottage	24.4	16.1	17.0

Design Manual for Roads and Bridges model results

- 5.2.4 This section provides the summary of the modelled pollutant concentrations for the assessed receptors using the DMRB methodology. The magnitude of change and impact descriptor are derived following the Environmental Protection UK (EPUK) methodology⁸.

Table 5: Summary of DMRB annual mean NO₂ results (construction phase)

Receptor	Concentrations ($\mu\text{g}/\text{m}^3$)			Change in concentrations ($\mu\text{g}/\text{m}^3$)	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
8-1	24.8	19.5	19.7	0.2	Imperceptible increase	Negligible

Table 6: Summary of DMRB annual mean PM₁₀ results (construction phase)

Receptor	Concentrations ($\mu\text{g}/\text{m}^3$)			Change in concentrations ($\mu\text{g}/\text{m}^3$)	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
8-1	18.7	17.6	17.7	<0.1	Imperceptible increase	Negligible

⁸ Environmental Protection UK (EPUK), (2010), *Development Control: Planning for Air Quality 2010*.

Assessment of significance

- 5.2.5 The overall magnitude of impact of the Proposed Scheme is negligible at worst for NO₂ and PM₁₀ during construction. Pollutant concentrations will remain well within air quality standards with and without the Proposed Scheme. AQMAs lie outside the study area.
- 5.2.6 The changes in air quality at worst-case receptors during the construction phase will not cause significant effects for receptors since the adverse impact is negligible, taking into account background air quality and air quality standards.

5.3 Operational traffic model

- 5.3.1 Operational traffic data used in this assessment are detailed in Volume 5: Appendix TR-001-000. Traffic data assessed were based on maximum traffic on affected roads during the operational phase of the Proposed Scheme.

Receptors assessed

- 5.3.2 No roads were identified that met the criteria outlined in the SMR. Therefore, no receptors were assessed.

Assessment of significance

- 5.3.3 There will be no significant effects arising from the negligible changes to air quality caused by traffic during operation.

6 References

Chiltern District Council (1997) *Chiltern District Local Plan*.

Chiltern District Council (2011) *Core Strategy for Chiltern District*.

Department for Environment, Food and Rural Affairs (Defra) (2012) *Defra Background Pollutant Concentration Maps*; <http://laqm.defra.gov.uk/maps/maps2010.html>; accessed: July 2013.

Environmental Protection UK (EPUK), (2010), *Development Control: Planning for Air Quality 2010*.

Highways Agency (2007) *The Design Manual for Roads and Bridges* (Volume 11, Section 3, Part 1 Air Quality HA207/07)

Institute of Air Quality Management (IAQM) (2011) *Guidance on the assessment of the impacts of construction on air quality and the determination of their significance*.

Three Rivers District Council (2002) *Local Plan 1996 - 2011*.

Three Rivers District Council (2011) *Core Strategy 2011*